RECEIVED
CENTRAL FAX CENTER
MAR 1 0 2005

MOTOROLA

Intellectual Property Section
Law Department

FAX COVER SHEET

DATE: March 10, 2005

TO: EXAMINER: CHANG, E. — 703-305-3416
(ADDRESSEE'S NAME) — (EXTENSION)
ART UNIT 2637 — 703-872-9306
(LOCATION) — (FAX NUMBER)

FROM: MATTHEW C. LOPPNOW — (847) 523-2585
(SENDER'S NAME) — (EXTENSION)

RE: APPLICATION NO. 09/590,594 - APPEAL BRIEF

TOTAL NUMBER OF PAGE(S) 26 (INCLUDING THIS PAGE)

Personal Communications Sector
600 North U.S. Highway 45, AN 475
Libertyville, IL 60048
Phone: (847) 523-2322 Facsimile: (847) 523-2350

I hereby certify that this correspondence is being facsimile transmitted to the U.S. Patent and Trademark Office (Fax No. 703-872-9306) on the date indicated below.

Signature ______________ Date March 10, 2005
Matthew C. Loppnow

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT:	KOSMACH et al.	EXAMINER:	Chang, E.
SERIAL NO.:	09/590,594	GROUP:	2637
FILED:	June 9, 2000	CASE NO.:	PF02072NA

ENTITLED: METHOD AND APPARATUS FOR ASSIGNING BIT METRICS FOR SOFT DECISION DECODING

Motorola, Inc.
Intellectual Property Department
600 North U.S. Highway 45
Libertyville, IL 60048

APPEAL BRIEF UNDER 37 C.F.R. § 1.192(c)

MS Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Further to the Notice of Appeal filed on January 12, 2005, Applicant submits the present Appeal Brief.

TABLE OF CONTENTS

Appl. No. 09/590,594
Atty. Docket No. PF02072NA

RECEIVED
CENTRAL FAX CENTER
MAR 1 0 2005

I. REAL PARTY IN INTEREST

The real party in interest is, Motorola, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences.

III. STATUS OF CLAIMS

Claims 1-25 are pending. Claims 1-25 are rejected and are the subject of the present appeal.

IV. STATUS OF AMENDMENTS

No amendments were filed subsequent to final rejection.

V. SUMMARY OF INVENTION

The inventions are drawn generally to a method and apparatus for assigning bit metrics for algebraic soft decision decoding (page 1, lines 4-8). A receiver (10) can be used to receive and decode messages. The receiver can include a detector (20) that can be adapted to detect transmitted symbols and a decoder (30) that can perform error correction and decoding functions (Fig. 1 and page 6, lines 15-20). In one embodiment, the detector can include a demodulator (40) adapted to generate inphase (I) and quadrature (Q) signal components. The magnitudes of inphase and quadrature filters can be squared and added to generate energy values for each of the possible symbols jk = 00, 01, 10, 11. The decoder can receive the output energy measurement from the detector and generate bit metrics for use in determining the least reliable bits (Fig. 2 and page 7, lines 10-19). In another embodiment, the detector can be a discrimination detector (Fig. 3 and page 8, lines 12-13).

VI. ISSUES

Whether claims 1, 13, and 25 are patenable under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

VII. GROUPING OF CLAIMS

Claims 1, 13 and 25 do not stand or fall together regarding the rejection thereof under 35 U.S.C. § 103.

VIII. ARGUMENT

Claim Limitations At Issue

In Claim 1, the limitations at issue are italicized below:

1. A receiver, comprising:

a detector adapted to demodulate a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase, the detector being further adapted to generate a plurality of energy values relating each received symbol to one of a plurality of potential symbols; and

a decoder adapted to generate *a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase* and *a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase*, the decoder being further adapted to *identify the least reliable bits in the received word based on one of the first and second sets of bit metrics*.

Examiner's Allegation

Claim 1 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

Applicants' Argument

Neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies f1, f2, f3, and f4 respectively, four detector outputs are obtained and then 2 pits corresponding to a frequency for which the largest detector output is obtained are outputted as h1 and h2)." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. However, the final Office Action still did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide proper motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis for actually combining the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious." However, this is not a proper basis for motivation. In particular, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office Action did not even attempt to address Applicants' specific assertions of the lack of

motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence <u>can</u> be represented by bit metrics does provide motivation for doing so. Therefore, the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

Accordingly, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase as recited in independent claim 1. Furthermore, the Office Actions have not provided proper motivation to combine the references.

Claim Limitations At Issue

In Claim 13, the limitations at issue are italicized below:

13. A method for assigning bit metrics for algebraic decoding in a receiver, comprising:

demodulating a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;

generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;

generating *a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase*; and

designating the least reliable bits in the received word based on one of the first and second sets of bit metrics.

Examiner's Allegation

Claim 13 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

Applicants' Argument

Neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the

second phase and designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 13. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies f1, f2, f3, and f4 respectively, four detector outputs are obtained and then 2 pits corresponding to a frequency for which the largest detector output is obtained are outputted as h1 and h2)." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD

decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In

particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values <u>in response to the receiver being assigned to the first phase</u> and a second set of bit metrics based on the energy values <u>in response to the receiver being assigned to the second phase</u>. However, the final Office Action <u>still</u> did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide <u>proper</u> motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis <u>for actually combining</u> the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious." However, this is not a <u>proper</u> basis for motivation. In particular, <u>there must be some suggestion or motivation</u>, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office Action did not even attempt to address Applicants' specific assertions of the lack of motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal

prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence <u>can</u> be represented by bit metrics does provide motivation for doing so. Therefore, the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

Accordingly, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values <u>in response to the receiver being assigned to the first phase</u> and a second set of bit metrics based on the energy values <u>in response to the receiver being assigned to the second phase</u> and designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 13. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

Claim Limitations At Issue

In Claim 25, the limitations at issue are italicized below:

25. A receiver, comprising:

means for demodulating a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;

means for generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;

means for generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase; and

means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics.

Examiner's Allegation

Claim 25 was rejected under 35 U.S.C. § 103 over Yamao et al. (U.S. Patent No. 6,351,498 B1) and Iwamura (U.S. Patent No. 5,742,620).

Applicants' Argument

Neither Yamao et al. nor Iwamura disclose a means for generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase and means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 25. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the

reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references, when combined, must teach or suggest all of the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure (MPEP 2142). The prior art must suggest the desirability of the claimed invention (MPEP 2143.01).

Yamao et al. discloses a digital modulation and demodulation scheme for radio communications involving fading (col. 3, lines 9-15). The first Office Action alleged generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase is disclosed at Fig. 13 and col. 8, lines 28-60. Applicants disagree. Lines 28-60 expressly state "after received signals are filtered through band-pass filters BPF1 to BPF4 having central frequencies f1, f2, f3, and f4 respectively, four detector outputs are obtained and then 2 pits corresponding to a frequency for which the largest detector output is obtained are outputted as h1 and h2)." There is nothing present in the quoted portion of the cited section, or any of the remaining portions of the cited section, of doing anything in response to a receiver being assigned to a phase. The cited section only discusses band-pass filtering around central frequencies and outputting 2 bits corresponding to a frequency. None of the cited section nor the remaining sections of Yamao et al. disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase.

Iwamura fails to make up for the deficiencies of Yamao et al. In particular, Iwamura discloses a Generalized Minimum Distance (GMD) decoding method and apparatus (col. 5, lines 12-25). Iwamura does not disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase. In fact, Iwamura has absolutely no disclosure of any relationship between a GMD decoding apparatus and phase whatsoever. Accordingly, Iwamura fails to make up for the deficiencies of Yamao et al.

Thus, neither Yamao et al. nor Iwamura disclose generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned

to the second phase and identifying the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 1.

Furthermore, the Office Actions have not provided proper motivation for combining the references. The first Office Action alleges motivation is based on "to have a more efficient decoding with less amount of parallel processing ability" and cites col. 5, lines 10-25 of Iwamura to support this allegation. However, this allegation does not provide motivation to combine the references. In particular, lines 10-25 only disclose the benefits of the disclosed GMD decoding method over a conventional GMD decoding method. Yet, Yamao et al. does not disclose the use of a GMD decoding method. Because, the only disclosed benefits of Iwamura relate to a GMD decoding method and because Yamao et al. does not utilize a GMD decoding method, there is no motivation to combine the teachings of Iwamura with Yamao et al. Thus, the Office Action has failed to establish a *prima facie* case of obviousness.

Applicants recognize that one reading the claimed invention may begin to recognize numerous benefits that suddenly become apparent only after reading the claimed invention. The more the exact words of the claims are read, the more one can realize the benefits only became apparent after reading Applicants' teachings. Upon reaching this realization, it is easy to notice that there is absolutely no evidence of motivation in the prior art and such evidence has not been provided by any of the Office Actions. Yet, such motivation is required for a proper rejection under 35 USC § 103. Once one notices there is no evidence of motivation in the prior art, one can understand that the Office Actions have applied impermissible hindsight in attempting to combine the references.

The final Office Action fails to make up for the deficiencies of the rejection in the first Office Action. In particular, in the Response to Arguments section, the final Office Action went into great detail describing the transmitter of Yamao et al. The final Office Action then only alleged the receiver performs the claimed features without providing any foundation for such allegations in the cited reference. The final Office Action seemed to imply that since the transmitter performs certain functions, the receiver allegedly performs the claimed function. Unfortunately, the final Office Action did not provide a basis for this implication. In particular, the final Office Action did not provide a basis for a receiver performing the specific features of the claimed invention. More particularly, in the first response, Applicants asserted that there is no disclosure in Yamao et al. of generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second

phase. However, the final Office Action still did not provide any foundation in the reference of the claimed feature. Because no such foundation existed, Applicants requested withdrawal of the rejection.

Additionally, Applicants previously asserted Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase. In the Response to Arguments section, the final Office Action alleged Iwamura teaches bit metrics in GMS decoding. Thus, the Office Action appeared to concede Iwamura has no disclosure of any relationship between a GMD decoding apparatus and phase.

Furthermore, Applicants asserted the Office Action did not provide proper motivation for combining the references. Unfortunately, the final Office Action still did not provide proper motivation for combining the references. In particular, the final Office Action only cited sections of each reference that discuss the operation of the references. However, the final Office Action did not provide any basis for actually combining the references. The final Office Action only made a conclusory remark of: "The motivation and benefit are obvious." However, this is not a proper basis for motivation. In particular, there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings (MPEP 2142). The allegations of the final Office Action only amounted to a circular allegation of the combination being obvious because it is obvious. In fact, the final Office Action did not even attempt to address Applicants' specific assertions of the lack of motivation. Thus, the final Office Action still did not provide proper motivation for combining the references.

The Advisory Action appears to admit the deficiencies of the previous Office Actions because it introduced new interpretations of the cited references. In particular, the Advisory Action alleged new, elaborate interpretations of two different embodiments of Yamao et al. in an attempt to fix the deficiencies of the previous Office Actions. Unfortunately, Applicants were not provided the opportunity to respond to these new interpretations during normal prosecution. Furthermore, the interpretations are so convoluted, Applicants assert they do not remedy the deficiencies of the previous Office Actions.

In particular, among other deficiencies, the new interpretations still do not disclose generating a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase. For example, the Advisory Action alleges "the output of the decoder 4-1 is a bit metrics wherein the (a1, a2) is the bit metrics." However, this is not taught by

Yamao et al. More particularly, Yamao et al. only states "The four sequences of 2 bits data outputted from the M-ary decoders 4-1 to 4-4 are then recomposed into the original 8 bits data (i) (at a point (i) indicated in Fig. 11) by the composition unit 8 using the inverse operations of what was applied at the transmitting side." Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase.

Additionally, the Advisory Action appears to concede that Yamao et al. does not state that it generates a first set of bit metrics based on the energy values in response to a receiver being assigned a first phase because the Advisory Action goes on to allege "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form." Unfortunately, this allegation is improper for at least two reasons. First, it is a new grounds of rejection that was not introduced in any previous Office Action, and Applicants have not been given the opportunity to traverse this allegation of what was well known. Thus, Applicants traverse this allegation in accordance with MPEP §2144.04. Second, the fact that first and second sets of sequence <u>can</u> be represented by bit metrics does provide motivation for doing so. Therefore, the allegation of "it is well known in the art that the first and second sets of sequence from the energy values of the envelop detector (as shown in Fig. 14) can be represented by bit metrics in math form" is improper.

Accordingly, neither Yamao et al. nor Iwamura disclose a means for generating a first set of bit metrics based on the energy values <u>in response to the receiver being assigned to the first phase</u> and a second set of bit metrics based on the energy values <u>in response to the receiver being assigned to the second phase</u> and means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics, as recited in independent claim 25. Furthermore, none of the Office Actions have provided proper motivation to combine the references.

Based on the foregoing, Applicants respectfully submit independent claims 1, 13, and 25 are allowable. The remaining claims depend from the allowable independent claims and are therefore also allowable. Accordingly, kindly reverse and vacate the rejection of claims 1-25 under 35 U.S.C. § 103, with instructions for the Examiner to allow claims 1-25.

CONCLUSION

In view of the discussion above, the claims of the present application are in condition for allowance. Kindly withdraw any rejections and objections and allow this application to issue as a United States Patent without further delay.

The Commissioner is hereby authorized to deduct the amount of $340 for filing a brief in support of an appeal and any fees arising as a result of this Appeal Brief or any other communication from or to credit any overpayments to Deposit Account No. 50-2117.

Respectfully submitted,

Matthew C. Loppnow
Attorney for Applicant
Registration No. 45,314

Phone No. (847) 523-2585

Dated: March 10, 2005

Fax No. (847) 523-2350
Please send correspondence to:
Motorola, Inc.
Intellectual Property
600 North U.S. Highway 45
Libertyville, IL 60048

IX. APPENDIX

Claims involved in the appeal:

1. (original) A receiver, comprising:

a detector adapted to demodulate a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase, the detector being further adapted to generate a plurality of energy values relating each received symbol to one of a plurality of potential symbols; and

a decoder adapted to generate a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase, the decoder being further adapted to identify the least reliable bits in the received word based on one of the first and second sets of bit metrics.

2. (original) The receiver of claim 1, wherein the decoder is further adapted to generate a plurality of candidate codewords based on the received word and the least reliable bits.

3. (original) The receiver of claim 2, wherein the decoder is adapted to generate a word metric comprising the sum of the bit metrics in one of the first and second sets for each of the candidate codewords.

4. (original) The receiver of claim 3, wherein the decoder is adapted to identify the candidate codeword having the greatest bit metric as a received codeword.

5. (original) The receiver of claim 1, wherein the detector comprises an envelope detector including a plurality of filters, each filter being adapted to generate a soft symbol energy associated with one of the potential symbols.

6. (original) The receiver of claim 5, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the decoder is adapted to select the soft symbol energy in each of the first and second subsets closest to an upper bound energy threshold to generate the first set of bit metrics.

7. (original) The receiver of claim 6, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the decoder is adapted to select the soft symbol energy in each of the second and third subsets closest to an upper bound energy threshold to generate the second set of bit metrics.

8. (original) The receiver of claim 1, wherein the detector comprises a discriminator detector adapted to generate an output energy, and the decoder is adapted to compare the output energy to a plurality of potential symbol energy thresholds to generate soft energies associated with the potential symbols values.

9. (original) The receiver of claim 8, wherein the decoder is adapted to clip the soft energy values at a maximum value.

10. (original) The receiver of claim 8, wherein the decoder is adapted to generate a channel attenuation estimate for each received symbol and generate one of the first and second sets of bit metrics based on the channel attenuation estimate.

11. (original) The receiver of claim 8, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the decoder is adapted to select the soft symbol energy in each of the first and second subsets closest to the associated potential symbol energy threshold to generate the first set of bit metrics.

12. (original) The receiver of claim 9, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the decoder is adapted to select the soft symbol energy in each of the second and third subsets closest to the associated potential symbol energy threshold to generate the second set of bit metrics.

13. (original) A method for assigning bit metrics for algebraic decoding in a receiver, comprising:

demodulating a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;

generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;

generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase; and

designating the least reliable bits in the received word based on one of the first and second sets of bit metrics.

14. (original) The method of claim 13, further comprising generating a plurality of candidate codewords based on the received word and the least reliable bits.

15. (original) The method of claim 14, further comprising generating a word metric comprising the sum of the bit metrics in one of the first and second sets for each of the candidate codewords.

16. (original) The method of claim 15, further comprising designating the candidate codeword having the greatest bit metric as a received codeword.

17. (original) The method of claim 13, further comprising generating a soft symbol energy associated with each of the potential symbols.

18. (original) The method of claim 17, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the method further comprises selecting the soft symbol energy in each of the first and second subsets closest to an upper bound energy threshold to generate the first set of bit metrics.

19. (original) The method of claim 18, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the method further comprises selecting the soft symbol energy in each of the second and third subsets closest to an upper bound energy threshold to generate the second set of bit metrics.

20. (original) The method of claim 13, further comprising:
generating an output energy associated with each of the received symbols; and
comparing the output energy to a plurality of potential symbol energy thresholds to generate soft energies associated with the potential symbols values.

21. (original) The method of claim 20, further comprising clipping the soft energy values at a maximum value.

22. (original) The method of claim 20, further comprising:
generating a channel attenuation estimate for each received symbol; and
generating one of the first and second sets of bit metrics based on the channel attenuation estimate.

23. (original) The method of claim 20, wherein a first subset of the potential symbols correspond to a binary 1 for the first phase and a second subset of the symbols correspond to a binary zero for the first phase, and the method further comprises selecting the soft symbol energy in each of the first and second subsets closest to the associated potential symbol energy threshold to generate the first set of bit metrics.

24. (original) The method of claim 21, wherein a third subset of the potential symbols correspond to a binary 1 for the second phase and a fourth subset of the symbols correspond to a binary zero for the second phase, and the method further comprises selecting the soft symbol energy in each of the second and third subsets closest to the associated potential symbol energy threshold to generate the second set of bit metrics.

25. (original) A receiver, comprising:

means for demodulating a received signal to generate a received word, the received word including a plurality of symbols, each symbol containing data associated with a first phase and data associated with a second phase;

means for generating a plurality of energy values relating each received symbol to one of a plurality of potential symbols;

means for generating a first set of bit metrics based on the energy values in response to the receiver being assigned to the first phase and a second set of bit metrics based on the energy values in response to the receiver being assigned to the second phase; and means for designating the least reliable bits in the received word based on one of the first and second sets of bit metrics.